Celebrate Pi Day on March 14 (3.14)

March 1, 2017

Each year the Museum takes time in March to acknowledge Pi (or π) Day. Pi is usually rounded to its first three digits: $\pi \sim 3.14$. The number series holds a fascination for mathematicians, scientists, and lay folks alike. The number is a mathematical constant and represents the ratio of a circle's circumference to its diameter. (See below)

According to piday.org:

Pi has been calculated to over one trillion digits beyond its decimal point. As an irrational and transcendental number, it will continue infinitely without repetition or pattern. While only a handful of digits are needed for typical calculations, Pi's infinite nature makes it a fun challenge to memorize, and to computationally calculate more and more digits.

According to Sara Del Valle, a researcher with the Lab's Information and Modeling group, one of the reasons for the interest is that, even as far out as the decimals have been calculated, "We never know what the next number will be."

Steven Strogatz addressed that issue in his *New Yorker* article "Why Pi Matters":

They [the digits] *go on forever, seemingly at random—except that they can't possibly be random, because they embody the order inherent in a perfect circle. This tension between order and randomness is one of the most tantalizing aspects of pi.*

Some, Sara says, have trouble with the ambiguity that results from the seeming randomness of pi. Mathematicians, in particular, crave a precision that they can't find in something that goes on forever, she said.

Why pi is important

"A lot of high school students don't understand why they need to grasp pi," says Sara, "but it's fundamental to geometry and trigonometry, as well as to calculations for many everyday things."

Among its uses are determining how much fuel a plane needs as it flies from place to place—since it's flying over a sphere. And anytime you want to manufacture something round, from basketballs to tubes for plumbing, you need to understand how to apply pi.

Of course, there are also higher-level calculations that use pi, such as [Machin's formula](#) and the [Gregory series](#), but enough of that. The links are there if you want to delve deeper.

Pi and controversy (Didn't see that coming, did you?)

Back in 2001, Bob Palais, a math professor at the University of Utah, wrote an opinion piece for *The Mathematic Intelligencer* called "*[# is Wrong!](#)"* Apparently, the counterargument against pi is that it is often used as 2π for equations, so why not just use 6.28 instead of 3.14?

That call reemerged again in 2010, when Michael Hartl wrote a book called [The Tau Manifesto](#) making a similar argument and offering up the name of "tau" as the shorthand of 2π or just τ as its symbol.

He's called for an annual [Tau Day on June 28](#) (6/28 on the American calendar) to raise awareness of the tau concept.

In case you don't have enough interest to absorb the contents of his book, Michael's website includes two videos explaining the concept of tau in both short (14 minutes) and long (51 minutes) versions to bring you up to speed.

Not that MIT is nerdy, but as a result of the argument for tau, the university changed its traditional admission decision deadline in 2012 from just Pi Day (March 14) to [Pi day PLUS Tau time](#) or March 14 at 6:28 p.m.

How a pi becomes law (or at least a resolution)

Just in advance of Pi Day in 2009, the [U.S. House of Representatives introduced Resolution 224](#), opening with quite a few "whereas" statements, including,

Whereas aptitude in mathematics, science, and engineering is essential for a knowledge-based society; etc…

The resolution eventually declared that the House of Representatives

(1) supports the designation of a "Pi Day" and its celebration around the world;

(2) recognizes the continuing importance of National Science Foundation's math and science education programs; and

(3) encourages schools and educators to observe the day with appropriate activities that teach students about Pi and engage them about the study of mathematics.

An Easter egg or two (but not 3.14)

We could go into the history of pi, explaining that the [concept likely dates back to the Babylonians](#) and that use of the symbol $_{(\pi)}$ began in 1706. Instead, here are some treats as a reward for making it this far down the page.

(1) There is a pi calculator ([Find Your Pi Day](#)) that will tell you how far along any date is in the numerical continuum.

For instance, today, March 1, 2017 (3•1•17), is at digit 73,973, and Pi Day this year (3•14•17) is at digit 226,131.

(2) If you happen to be in our neighborhood on Pi Day this year, go next door to Time Out Pizzeria and get a seven-inch personal pizza with one topping for just $3.14— normally $4.25! Just mention this article. (Or don't. They'll sell you one at the price anyway…)

So whether you want to celebrate [Pi Day](#), [Tau Day](#), or both, Sara's personal take is that —for historical reasons—she'll stick with pi.

Notice we got through this whole article without one "pie" joke…this year. But, find the "pie" chart in another article in this issue, and good for you!